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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,374	06/18/2001	Bor-Ming Hsieh	MSI-742US	1783
22801	7590	10/04/2004	EXAMINER	
LEE & HAYES PLLC 421 W RIVERSIDE AVENUE SUITE 500 SPOKANE, WA 99201			WU, QING YUAN	
			ART UNIT	PAPER NUMBER
			2126	

DATE MAILED: 10/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/884,374	<b>Applicant(s)</b> HSIEH, BOR-MING	
	<b>Examiner</b> Qing-Yuan Wu	<b>Art Unit</b> 2127	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 8/10/2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1-56 are pending in the application.
2. To insure proper consideration and to the extent required by 37 CFR 1.56, applicant is required to update the information hereby incorporated by reference (e.g. serial number, and filing date of "Run Queue Management," see specification, pg. 1, lines 2-4).

### ***Specification***

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Objections***

4. The following claims are objected to because of the following informalities:
  - a. Extra indentation on Claim 37, line 14.
  - b. Indentation needed on claim 23, line 13, and claim 49, line 21.Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. Claims 4-6, 11-12, 15-17, 22-30, 38, and 56 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. The following terms lacks antecedent basis:
  - i. The new thread wake-up time- claim 11, line 12, and claims 12, 22-23.
  - ii. The new thread priority- claim 11, lines 14-15, and claim 22.
  - iii. The new thread- claim 11, lines 16-17, and claim 12, 22-23.
- b. The following claim language is indefinite:
  - i. As per claims 4-6, 15-17 it is uncertain what's the applicant mean by "deterministic amount of time" (i.e. what type of deterministic scheme is used?).
  - ii. As per claim 24, it is uncertain how an "atomic walk procedure" works (i.e. applicant should also consider defining "atomic walk procedure" in this claim).
  - iii. As per claim 25, it is uncertain what "a last examined thread" is (i.e. is it the last inserted thread?)
  - iv. As per claim 38, it is uncertain whether this is a computer-readable medium claim or a system claim (i.e. applicant is required to rewrite the claim in the correct independent form).
  - v. As per claim 56, it is uncertain if this is a sleep queue data structure claim or a computer readable medium claim.

***Claim Rejections - 35 USC § 101***

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 1-12, and 24-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-12, and 24-30 are directed to method steps which can be practiced mentally in conjunction with pen and paper, therefore they are directed to non-statutory subject matter.

Specifically, as claimed, it is uncertain what performs each of the claimed method steps. The claimed steps do not define a machine or computer implemented process [see MPEP 2106].

(The examiner suggests applicant to change “method” to “computer implemented method” in the preamble to overcome the outstanding 35 U.S.C. 101 rejection).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (hereafter AAPA), in view of Young (U.S. Patent 6,609,161).

11. As to claim 1, AAPA teaches the invention substantially as claimed including managing a single-dimension sleep queue implemented as a linked list, the managing comprising:

inserting a thread into the single-dimensional queue [AAPA, pg. 4, line 12]; and  
removing the thread from the single-dimensional queue [AAPA, pg. 4, lines 10-12].

12. AAPA does not specifically teach implementing the sleep queue as a multi-dimensional queue. However, Young disclosed managing a multi-dimensional queue [255, Fig. 3A; 260A, Fig. 3B], wherein the managing comprises, (for exemplary purpose, Young uses queues of SCSI control blocks, hereafter SCB, to represent queues of control blocks) inserting an SCB into the multi-dimensional queue [col. 5, line 42; Fig. 4]; and removing the SCB from the multi-dimensional queue [col. 6, lines 30-31, lines 42-44; Fig. 5].

13. It would have been obvious to one of ordinary skill in the art, to have combined the single-dimensional sleep queue of AAPA with Young's multi-dimensional queue because Young's system has the ability to detach/removed a group of SCB independent of the number of SCBs in the group, that are linked in a queue to avoid multiple access to the queue [col. 4 lines 12-17], thereby resolving AAPA's issue by eliminating the non-deterministic amount of time that will be spend on removal and insertion of threads [AAPA, pg. 4, lines 21-22]. The

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combination of AAPA and Young's system will yield a deterministic thread management system as described by AAPA.

14. As to claim 2, AAPA as modified teaches the invention substantially as claimed including wherein the multi-dimensional sleep queue is a real-time multi-dimensional sleep queue [AAPA, pg. 1, lines 16-18].

15. As to claim 3, AAPA as modified teaches the invention substantially as claimed wherein the multi-dimensional sleep queue is a two-dimensional sleep queue [abstract; Fig. 3B].

16. As to claims 4-5, these claims are rejected for the same reason as claim 1 above.

17. As to claim 7, AAPA as modified teaches the invention substantially as claimed wherein the thread has a wake-up time and a priority [AAPA, Fig. 2; pg. 3, lines 3-14], and wherein inserting the thread into the multi-dimensional sleep queue further comprises:

sorting the thread with respect to a first dimension of threads and a second dimension of threads, the thread being sorted first with respect to the first dimension and second with respect to the second dimension [col. 5, line 52 to col. 6 line 18].

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18. AAPA as modified does not teach the first dimension of threads being sorted based on respective thread wake-up times, the second dimension of threads being sorted based on respective thread priorities. However, Young disclosed sorting the first dimension common queue based on the order of arrival and having only one SCB per target [col. 2, lines 9-11; col. 4, line 63; 275, Fig. 3B; 402, 405-408, Fig. 4], the second dimension target queue sorted based on the order of arrival and having once specific target [col. 5, lines 6-7; 270A-272A, Fig. 3B; 401-404, Fig. 4].

19. It would have been obvious to one of ordinary skill in the art, to have substitute the parameters in Young's two-dimensional queue with to AAPA's parameters, a wake-up time and a priority. The combination would resolved the defect of AAPA as stated above in claim 1. All in all, the changes and modifications made did not depart from Young's system in a broader aspect.

20. As to claim 6, this claim is rejected for the same reason as claims 1 and 7 above.

21. As to claims 8-9, AAPA as modified teaches the invention substantially as claimed in claim 7, wherein each thread in the first plurality having a different respective thread wake-up time [Different target; 275, Fig. 3B] and each thread in the second plurality having a same respective thread wake-up time [Same target; 270A-272A, Fig. 3B].



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22. As to claims 10-12, these claims are rejected for the same reason as claims 1-7 above.

23. As to claims 13-23, these are computer-readable medium claims that correspond to method claims 1-12. Therefore, they are rejected for the same reason as method claims 1-12 above.

24. As to claim 24, AAPA as modified in claim 1 teaches the invention substantially including a method for managing a multi-dimensional sleep queue comprising:

inserting a new thread into the multi-dimensional sleep queue using a multi-dimensional atomic walk procedure [col. 5, line 42; Fig. 4]; and

removing the new thread from the multi-dimensional sleep queue for insertion into a run queue [AAPA, pg. 4, lines 10-12].

25. As to claim 25, AAPA as modified teaches the invention substantially as claimed in claim 24 including wherein inserting the new thread further comprises:

if the new thread is a first thread, settling a last examined thread to reference the new thread, the last examined thread being used to identify an insertion point for the new thread [col. 6, lines 1-14]. (Examiner's interpretation of "a last examined thread" as the last entry on the common queue since applicant did not preclude nor define this limitation).

26. As to claims 26-27, these claims are rejected for the same reason as claim 6 above.

27. As to claim 28, this claim is rejected for the same reason as claim 1 above.

28. As to claim 29, this claim is rejected for the same reason as claims 1 and 7 above.

29. As to claim 30, AAPA as modified teaches the invention substantially as claimed in claim 29. AAPA as modified does not specifically teach determining a status of a last examined thread and searching for thread insertion point to insert threads based on the status. However, Young disclosed a scratch memory that stores the value of tail pointers that points to the last SCB in the queues [350, Fig. 3A; 404, 407-408, Fig. 4].

30. It would have been obvious to one of ordinary skill in the art, to have recognized that changes in the status of the last examined thread can be used to determining a starting point for insertion because doing so will yield a more optimized insertion procedure by not having to traverse the entire queue to locate an insertion point if the status of a last examined thread does not change.

31. As to claims 31-38, these are computer-readable medium claims that correspond to method claims 24-30. Therefore, they are rejected for the same reason as method claims 24-30 above.

32. As to claims 39-49, these are system claims that correspond to claims 1-38. Therefore, they are rejected for the same reason as claims 1-38 above.

33. As to claims 50-56, these are sleep queue data structure claims that correspond to claims 1-38. Therefore, they are rejected for the same reason as claims 1-38 above.

34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qing-Yuan Wu whose telephone number is (571) 272-3776. The examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner

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